

CLAIMS:

1. An integrated circuit chip comprising, in sequence, a substrate layer of a substrate material, an insulating layer of an insulating material, a first electrically conductive layer of a first electrically conductive material, a dielectric layer of a dielectric material and a second electrically conductive layer of a second electrically conductive material, said IC chip
5 comprising at least one integrated circuit and at least one integrated electrostatic discharge protection device, said electrostatic discharge protection device comprising a pair of spaced center and circumferential electrodes, the center electrode being formed by the first electrically conductive layer and the circumferential electrode being formed by the second electrically conductive layer, said electrodes being separated by a steroidal spark gap cavity,
10 wherein the toroid of the steroidal spark gap cavity comprises a base layer formed by the insulating layer of the integrated circuit chip, a side wall formed by the circumferential electrode, a cover layer formed by the dielectric layer of the integrated circuit chip, and the center of the toroid being formed by the center electrode comprising a contact pad in contact with the insulating layer, said electrostatic discharge protection device also comprising means
15 to electrically connect the center electrode to input circuit paths to be protected from electrostatic discharge and means to electrically connect the circumferential electrode to an electrostatic discharge path comprising either a connection to a circuit ground or a circuit supply voltage.
- 20 2. The integrated circuit chip of claim 1, further comprising a passive component selected from the group comprising resistors, capacitors, and inductors.
3. The integrated circuit chip of claim 1, wherein the first electrically conductive material is polysilicon.
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4. The integrated circuit chip of claim 1, wherein the second electrically conductive material is aluminum.

5. The integrated circuit chip of claim 1, wherein the spark gap cavity contains a noble gas for reducing the breakdown voltage of the electrostatic discharge protection device.

6. The integrated circuit chip of claim 1, wherein the substrate material is
5 selected from the group comprising silicon, glass and a ceramic material.

7. A method of fabricating an integrated circuit chip comprising an integrated circuit and an electrostatic discharge protection device according to the invention, including the steps of a) providing a semiconductor substrate, b) depositing an insulating layer on the
10 semiconductor substrate, c) depositing a first electrically conductive layer of a first electrically conductive material on said insulating layer, d) depositing a dielectric layer of a dielectric material on said first electrically conductive layer, e) etching spaced contact windows for a center electrode and a circumferential electrode, f) depositing a mask, g)
15 etching a hollow groove into the first electrically conductive layer under the circumference of the contact window of the circumferential electrode, h) depositing a layer of a second electrically conductive layer through the contact window of the center electrode to mechanically contact the insulating layer, and through the contact window of the circumferential electrode to electrically contact the first electrically conductive layer, i)
20 connecting the center electrode to input circuit paths to be protected from electrostatic discharge and connecting the circumferential electrode to an electrostatic discharge path comprising either a connection to a circuit ground or a circuit supply voltage.